REMARKS

Reconsideration is respectfully requested of the Office position. In the present amendment, claim 1 has been amended to recite "ring spun". Antecedent support for this terminology is present from the description as a whole of the yarns and more specifically Example 5 and Figure 4. Claims 1 to 10 remain under consideration; claims 11 to 23 are indicated as withdrawn.

In accordance with the requirement set forth in paragraph 3 of the Office communication, the present response is accompanied by a separate filing with a Replacement Sheet for Figure 3.

In accordance with the requirement set forth in paragraph 4 of the Office communication, a new Abstract is attached which deletes "(30)" in reference to the central core. (Also, the underlining under Abstract is no longer present),

Claim Rejections 35 USC § 102

U.S. Patent No. 4,541,231 (Graham, Jr. *et al.*)

The Examiner has rejected claims 1-3, 8 and 10 as being anticipated by U.S. Patent No. 4,541,231 (Graham, Jr. *et al.*). This rejection is respectfully traversed. Claim 1 is directed to a composite dual core-spun, ring-spun yarn, with a ring-spun covering. In a dual core-spun yarn, as claimed in claim 1, two fibre slivers are wound around a core to form a covering [see the Application, for example page 3, line 30 to page 4, line 8]. An important feature of the yarn claimed in claim 1 is that the opposite twists of the core and the covering exert opposite and substantially equal torques. In this way a single core-spun yarn having substantially no torque is produced. In contrast, Graham *et al.* do not disclose a torqueless core-spun yarn. This is clear from step (d) of the process used to produce the 2-plied yarn in Graham *et al.*, which involves ply twisting two or more single yarns in the opposite direction from the spinning direction to produce a torque-free 2-ply yarn [Graham *et al.*, column 2, lines 7-12]. In other words, the single yarns, which correspond to the core-spun yarns of the invention, are clearly not torque-free. In fact, it is necessary to overcome the torque in the single yarns by twisting two of them together in opposite directions so that their torques cancel. This is nothing more than the prior art solution that is described in the Application at page 2, lines 28-31, and Figure 3.

Graham, Jr. *et al.* do not disclose a dual core-spun, ring-spun yarn in which the covering is spun on the core with an opposite twist to the core, such that the opposite twists of the core and the covering exert opposite and substantially equal torques, as required by claim 1. Claim 1 is novel over Graham, Jr. *et al.*

Claims 2, 3, 8 and 10 depend directly on claim 1, and are therefore also novel.

U.S. Patent No. 5,802,826 (Sawhney *et al.*)

The Examiner has rejected claims 1-5, 8 and 10 as being anticipated by U.S. Patent No. 5,802,826 (Sawhney *et al.*).

In response to the Examiner's comments, claim 1 has been amended to recite that the claimed yarn is a *ring-spun* yarn (i.e. a yarn based in ring-spun technology). The fact that the yarns disclosed in the application are ring-spun is clear from the description as a whole, and Example 5 and Figure 4 in particular. Sawhney *et al.* does not disclose ring-spun yarns or ring-spinning processes, but rather friction spun yarns and friction-spinning processes. Claim 1 is therefore novel over Sawhney *et al.*

Claims 2-5, 8 and 10 depend directly on claim 1, and are therefore also novel.

Claim Rejections 35 USC § 103

U.S. Patent No. 4,541,213 (Graham *et al.*)

The Examiner has rejected claims 5 and 6 as being obvious over U.S. Patent No. 4,541,231 (Graham *et al.*). This rejection is respectfully traversed.

As pointed out above, Graham *et al.* does not disclose a dual core-spun, ring-spun yarn having a covering with an opposite twist to that of the core, such that the torque of the covering is balanced by the opposite torque of the core so as to yield a twist free yarn, as claimed in claim 1. In fact, Graham *et al.* teaches and entirely different way of obtaining an essentially torque-free yarn: two core spun yarns with torque are ply twisted in such a way that their torques cancel. The result is not a core-spun yarn having no torque, but rather a two-ply yarn comprising two core-spun yarns, which core spun yarns have *substantial* torque. Graham *et al.* does not teach or suggest the invention of claim 1, since there is no suggestion whatsoever of producing a torque-free core-spun yarn.

Claim 5 is directed to a composite dual core-spun, ring-spun yarn, as in claim 1, wherein the covering is made of viscose fibres. Since Graham *et al.* does not teach of suggest a dual core-spun, ring-spun yarn that is torque-free, it cannot teach or suggest such a yarn having a covering made of viscose. Claim 5 is not obvious in the light of Graham *et al.*

Claim 6 is directed to a composite dual core-spun, ring-spun yarn, as in claim 1, wherein the core is covered at least 90% by the covering. Since Graham *et al.* does not teach of suggest a dual core-spun, ring-spun yarn that is torque-free, it cannot teach or suggest such a yarn having the core covered at least 90% by the covering.

The Examiner has rejected claim 9 as being obvious over Graham *et al.* in the light of U.S. Patent No. 4,520,623 (Ogawa *et al.*). Claim 9 is directed to a composite dual core-spun, ring-spun yarn, as in claim 1, wherein the yarn has a specific twist coefficient. Since Graham *et al.* does not teach of suggest a dual core-spun, ring-spun yarn that is torque-free, it cannot teach a yarn of this type having a specific twist coefficient.

The Applicant submits that the claims are not obvious in the light of Graham *et al.*, either alone or in combination with other references.

U.S. Patent No. 5,802,826 (Sawhney *et al.*)

The Examiner has rejected claims 6 and 7 as being obvious over U.S. Patent No. 5,802,826 (Sawhney *et al.*).

As pointed out above, Sawhney *et al.* does not disclose ring-spun composite yarns, but rather friction spun composite yarns. A friction-spun yarn is fundamentally different from a ring-spun yarn, and the teaching of one cannot be applied to the other.

A dual core-spun, ring-spun yarn, as is the case with the yarn of the invention, is produced by bringing together two fibre slivers to form a spinning triangle, feeding the core in the spinning triangle between the two fibre slivers with the latter at an angle to the core, and spinning the brought together fibre slivers around the core (see Figures 4A and 4B). The resulting yarn consists of a core covered by a twisted strand of fibres having either an S or a Z twist. The sheath has a true, unidirectional twist. This is described by Sawhney *et al.*, at column 2, lines 58-59.

In contrast, Sawhney *et al.* teaches a method using a combination of two "open-ended" spinning techniques: air-jet spinning and friction spinning. Open-ended spinning techniques result in yarns having what is known as "false twist". For example, in friction spinning, as is used by Sawhney *et al.* to form the sheath, fibres are fed into the nip of rollers and the fibres are twisted as they pass through the rollers. This results in a twist that is released when the yarn exits the rollers. The result is what is known as a false twist. This is described in Sawhney *et al.* at column 2, lines 7-10. A false twist can be observed in the yarn as small areas of randomly distributed S and Z twists, often separated or interspersed with untwisted regions of yarn. Yarns with false twists are intrinsically essentially torque-free, because for each S twist region, there is an opposing Z twist region.

In the method of Sawhney *et al.*, air-jet spinning is used to make the central core, while friction spinning is used to make the sheath surrounding the core. The result is a core having a false twist surrounded with a sheath having a false twist. The examiner has referred to the following passage:

> *Preferably, the twist direction of the airjet spinner is opposite to that of the friction spinner, in order to produce torqueless interlocking of core and sheath...*" [Sawhney *et al.*, column 3, lines 14-16]

This passage refers to the twist direction used in the spinning machines, but not the twist of the actual resulting yarn. In the combination of air-jet spinning and friction spinning, the twist in the machine is used simply to cohere the filaments. By using opposite directions

in the two machines, improved interlocking of the fibres is obtained. However, a lasting true twist is not imparted to the yarn, as in ring spinning.

The method of the invention involves imparting a true twist to the core, and an opposite true twist to the sheath, with the torque in the sheath being equal but opposite to that in the core. This results in a torque free ring-spun yarn. This type of yarn has substantially higher strength than friction-spun yarns. A method producing false twist, as disclosed in Sawhney *et al.*, cannot teach anything about a method that imparts a true twist, such as the method of the invention.

Respectfully submitted,

for **JOHN E. GRIFFITHS** Reg 25,243
ATTORNEY FOR APPLICANT
Registration No.: 32,647
Telephone: (302) 892-7909
Facsimile: (302) 892-7343

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